ORDER

6750.53

CATEGORY I INSTRUMENT LANDING SYSTEM (CAT I ILS)
PROJECT IMPLEMENTATION PLAN

March 20, 1992

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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RECORD OF CHANGES

DIRECTIVE NO. 6750.53

CHANGE TO BASIC	SUPPLEMENT			OPTIONAL	CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL

FOREWORD

This order transmits the project implementation plan (PIP) which provides management direction for the implementation and acceptance of the Category I Instrument Landing System (CAT I ILS) with Remote Maintenance Monitoring (RMM) into the National Airspace System (NAS). It defines the major functional responsibility levels, management direction, and overall program guidance to all responsible levels within the Federal Aviation Administration (FAA) for the procurement and implementation of the CAT I ILS.

Gary N. Skillicorn
Program Manager for Landing

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CHAPTER 1. GENERAL

1. PURPOSE. This order transmits the project implementation plan (PIP) which provides technical guidance and direction for the implementation of Category I Instrument Landing Systems (CAT I ILS) with Remote Maintenance Monitoring (RMM) into the National Airspace System (NAS). It establishes program management, implementation policy, and responsibilities governing the activities of organizations. The PIP is organized and presented in accordance with FAA-STD-036, Preparation of Project Implementation Plans.

2. DISTRIBUTION. This order is distributed to branch level in the office of the Program Directors for Communications, Navigation and Landing, and Weather and Flight Service Systems; the NAS System Engineering, Systems Maintenance, and Acquisition Support Services; Aviation Standards National Field Office, Office of Airport Standards; to division level in the Flight Standards and Air Traffic Plans and Requirements Services; to branch level in the regional Airway Facilities, Logistics, Airports, Air Traffic, and Flight Standards divisions; to director level at the FAA Technical Center; to branch level in the FAA Logistics Center and FAA Academy at the Mike Monroney Aeronautical Center and limited distribution to the Airway Facilities (AF) General National Airspace System (GNAS) sectors, sector field offices, sector field units, and sector field office units.

3. DEFINITIONS. The following acronyms and abbreviations are used in this order:

AF	Airway Facilities
ACT	Technical Center
AIP	Airport Improvement Plan
APMC	Associate Program Manager for Contracting
APML	Associate Program Manager for Logistics
APMQ	Associate Program Manager for Quality
APMSE	Associate Program Manager for System Engineering
APMT	Associate Program Manager for Test
ARTCC	Air Route Traffic Control Center
ATCT	Air Traffic Control Tower
BC	Back Course
CAI	Contract Acceptance Inspection
CAT I ILS	Category I Instrument Landing System
CCB	Configuration Control Board
CCD	Configuration Control Document
CDI	Course Deviation Indicator
CE	Capture Effect Antenna
CIP	Capital Investment Plan
CO	Contracting Officer
DCE	Data Communications Equipment
DME	Distance Measuring Equipment
DRR	Deployment Readiness Review
EXCOM	Executive Committee
FAA	Federal Aviation Administration
FM	Fan Marker
FRDF	Facility Reference Data File
FY	Fiscal Year

GBL	Government Bill of Lading
GFM	Government Furnished Materials
GS	Glide Slope or Glide Slope Antenna Type
ICD	Interface Control Document
ID	Site Identification
ILS	Instrument Landing System
ILSP	Integrated Logistics Support Plan
JAI	Joint Acceptance Inspection
LCU	Link Control Unit
LDA	Localizer Type Directional Aid
LOC	Localizer or Localizer Antenna Type
LPD	Log Periodic
LRU	Line Replaceable Unit
MDT	Maintenance Data Terminal
MK	Number and Type of Markers
MM	Middle Marker
MPS	Maintenance Processor Subsystem
MTBF	Mean Time Between Failure
MTP	Master Test Plan
MTTR	Mean Time To Repair
N	Narrow Aperture Antenna
NAILS	NAS Integrated Logistics Support
NAILSMT	NAILS Management Team
NAS	National Airspace System
NCP	NAS Change Proposal
NOTAM	Notice to Airmen
NR	Null Reference Antenna
OM	Outer Marker
ORD	Operational Readiness Demonstration
OSHA	Occupational Safety and Health Administration
PIP	Project Implementation Plan
PIR	Portable ILS Receiver
PDSR	Program Directors Status Review
QRO	Quality Reliability Officer
REG	Region
RF	Radiofrequency
RMM	Remote Maintenance Monitoring
RMS	Remote Monitoring Subsystem
RVR	Runway Visual Range
RW	Runway
SB	Side Band Reference Antenna
ST	State
T&E	Test and Evaluation
TPRB	Test Policy and Planning Review Board
TWA	Traveling Wave Antenna
UHF	Ultra High Frequency
VHF	Very High Frequency
VR	V-Ring Antenna
VRTM	Verification Requirements Traceability Test Matrix
W	Wide Aperture Antenna

4. AUTHORITY TO CHANGE THIS ORDER. The Program Manager for Landing, ANN-200, is the approval authority for all changes to this order.

5.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The CAT I ILS project consists of the procurement of ILS equipment as defined in specification FAA-E-2492/2c, Category I Instrument Landing System, Equipment Requirements. The equipment includes all of the components of a CAT I ILS including localizer, glide slope, middle marker, outer marker, ILS status/control units, and will include RMM. The project will furnish equipment to replace Mark 1A, B, C, and Mark 12 ILS at approximately 180 locations as authorized in Capital Investment Plan (CIP) 44-22. In addition, plans include the procurement of an estimated 100 new systems under CIP 34-06, an allowance for 105 systems under the Airport Improvement Program (AIP), an allowance for 188 Congressional mandated systems, 35 non-Federal ILS takeover/replacements and 8 systems for Department of Defense (U.S. Navy). Finally, provision is made for the procurement of 80 CAT I ILS localizer log periodic (LPD) antennas to replace the same number of existing traveling wave antennas (TWA).

a. Procurement by Fiscal Year (FY). Contract award for procurement of CAT I ILS with RMM are planned as follows:

(1) FY 1992/1993 - 148 CAT I ILS Systems.

(2) FY 1995 - 194 CAT I ILS Systems.

(3) FY 1996 - 84 CAT I ILS Systems.

(4) FY 1997 - 82 CAT I ILS Systems.

(5) FY 1998 - 108 CAT I ILS Systems.

NOTE: Only the FY 1992 procurement will be funded at the inception of the contract which, however, will include options for the purchase of up to the stated number of systems during FY 1993 through FY 1998.

b. Basic Equipment. The basic CAT I ILS equipment will consist of the following:

(1) Localizer transmitter and monitor.

(2) Narrow aperture localizer antenna array except when existing V-ring array is retained.

(3) Null reference glide slope transmitter and monitor, including glide slope antennas and tower.

(4) Middle and outer marker equipment, including antennas and supports.

(5) ILS status and control unit.

(6) ILS status unit.

(7) Embedded RMM.

c. Conversion Equipment. In addition to the basic ILS equipment listed in paragraph 20.b, conversion equipment is being procured as follows for new locations:

(1) Wide aperture localizer antenna kit.

(2) Capture effect glide slope kit.

d. Replacement Facilities. Equipment furnished will be in accordance with existing or projected requirements whether for wide or narrow aperture antenna localizers, and, in the case of the glide slope, null reference, sideband reference, or capture effect systems. This project does not furnish receiver monitors or test equipment for replacement facilities. For replacement projects, regions should use as much of the existing test equipment as feasible. If new test equipment is required it should be ordered through the System Maintenance Service (ASM). Existing shelter buildings, if in satisfactory condition, will be used for installation of new equipment. Regions should plan for new shelters as needed, submit proposal to the program office for project authorization. Existing localizer V-ring arrays will also be retained where a localizer back course is required. Existing glide slope towers will be retained with the exception of installations that are being converted to capture effect.

e. New Facilities. New facilities will receive test equipment. If shelters are not furnished, the new facilities will receive funds to purchase and install shelters with the required lightning protection. The project will provide regional funds for the establishment of new facilities.

21. PURPOSE. This project is to procure and install ILS equipment to provide instrument approach guidance on designated Category I runways.

22. HISTORY.

a. The present ILS population is comprised of several generations of equipment, none of which have RMM capability.

b. This project will provide up to 616 CAT I ILS Systems of which nearly one-third are replacements for systems which are increasingly difficult to maintain.

23.-29. RESERVED.

CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. CAT I ILS approach procedure provides for aircraft approach to a height above touchdown of not less than 200 feet and with runway visual range (RVR) of not less than 2,600 feet. CAT I approaches are currently being made down to 1,800 feet RVR. The CAT I ILS consists of a localizer, a glide slope, marker beacons, monitor and control equipment. Other electronic facilities that may be used with an ILS include compass locators and/or distance measuring equipment (DME). The latter two equipments are not included in this project. A standard interface between the localizer and DME will be developed in coordination with ANN-130.

a. Localizer. The localizer is a single transmitter, operating from 108 to 112 Megahertz, that feeds radiofrequency (RF) energy into an antenna system. It transmits a signal that provides an approach course along the extended center line of the runway, furnishing horizontal guidance by actuation of the vertical pointer of the course deviation indicator (CDI) in the aircraft. The localizer antenna is normally located about 1,000 feet from the stop end of the runway facing the touchdown end of the runway that it serves. The building that houses the localizer lies to the side of the runway at a minimum distance of 250 feet from the extended runway centerline (see figure 3-1, CAT I ILS System Placement).

(1) Very High Frequency (VHF) Localizer Station. A completely equipped CAT I VHF localizer station will consist of the following:

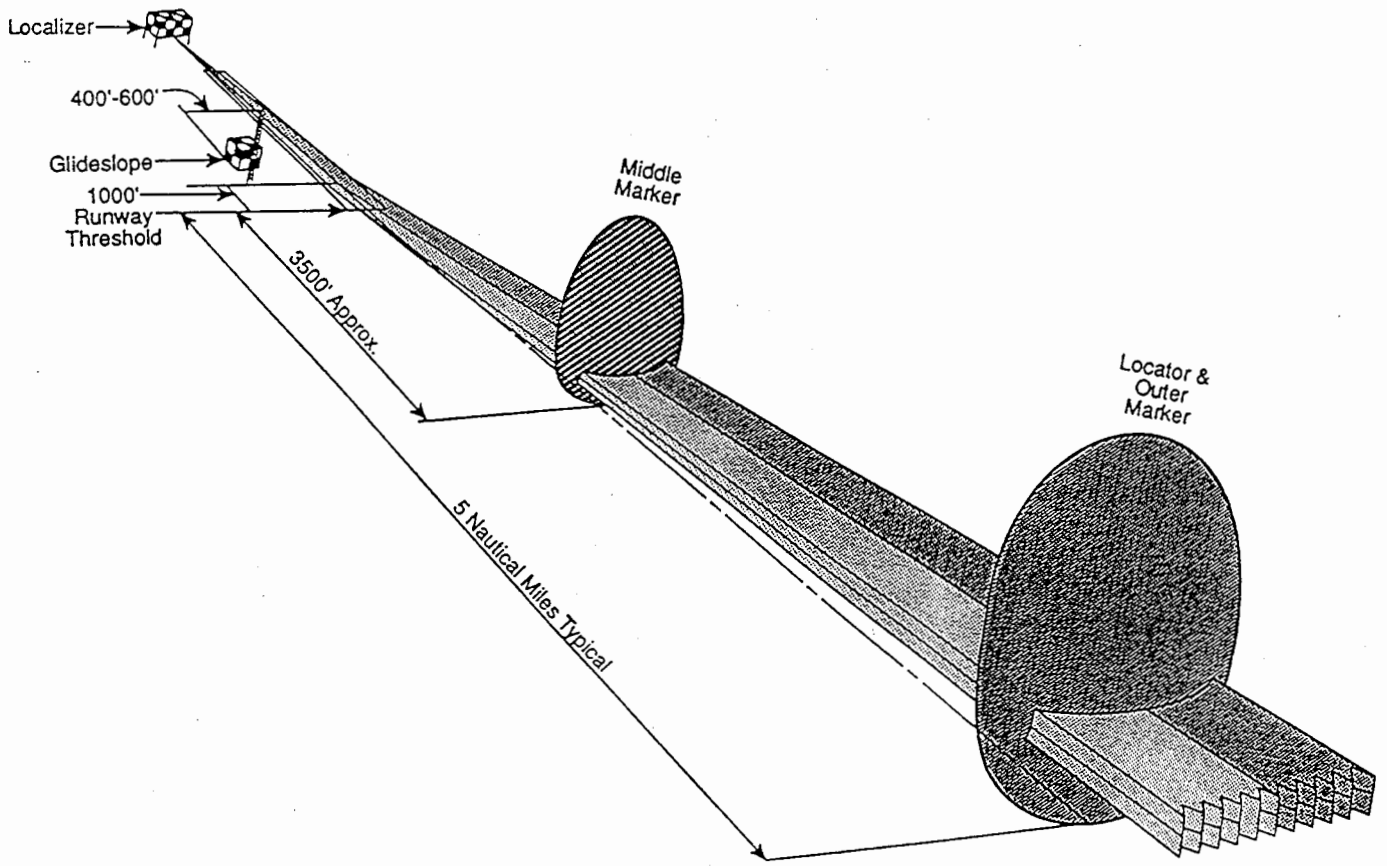
(a) A transmitter with associated modulation and control equipment with a backup battery power supply system for the localizer station.

(b) A localizer antenna array with associated cabling, RF distribution unit, integral monitor pickup devices, and monitor combining unit, obstruction lights, antenna element support structures, etc.

(c) A localizer monitor group that contains circuitry to monitor localizer functions. If a station fault persists for a preset period, the monitor will cause radiation of the localizer transmitter to cease, initiate a local aural and visual alarm, and transmit the alarm to the remote control point.

(2) Localizer Antenna Array Type. The antenna equipment consists of two types of directional localizer antenna arrays. Each array has its own RF distribution network and integral monitor combining network system and is of modular antenna construction to allow the smaller array to be converted to the larger array. The antenna systems will include radiating elements, radomes, mounting

FIGURE 3-1. CAT I ILS SYSTEM PLACEMENT



bases and support posts, distribution network, in-line phase detector, integral monitoring, monitor combining network and detection system, interconnecting RF cables, obstruction lights, and power cables. The in-line phase detector includes an RF sampler and detection system to enable the establishment and maintenance of the optimum carrier + sideband to sideband-only phase relationship in the array. The 90/150 Hertz audio modulation as detected at the antenna will be routed to the localizer shelter for test purposes. A back course will not be provided for new establishment sites. If a back course is needed it will be provided by installing a localizer at the opposite end of the runway.

(a) Narrow Aperture. The narrow aperture antenna array delivered with the system is the smaller of the two single frequency arrays, for use at the least difficult sites.

(b) Wide Aperture Conversion Kit. The wide aperture antenna array is the larger of the two single frequency arrays and is intended for use at moderately difficult sites. This array may be procured and implemented directly but the design of the narrow aperture array is such that a wide aperture array may also be achieved by adding additional antenna elements to the narrow aperture array and replacing or, if it is found feasible, converting the narrow aperture to a wide aperture RF distribution and monitor combining networks.

(c) V-ring Antenna. Existing 8, 14 or 15 element V-ring arrays will be retained in lieu of installing a unidirectional narrow or wide aperture array where a localizer back course is required. The new transmitter and monitor will interface with the V-ring array which also includes an existing RF distribution unit, a monitor recombining unit, obstruction lights and cabling.

b. Glide Slope. The glide slope is a transmitter, operating from 329 to 335 Megahertz, that feeds RF energy to a set of antennas. It transmits a signal that produces an angular glide path along the approach course as defined by the localizer. This provides vertical guidance to the pilot by actuation of the horizontal pointer of the CDI in the aircraft. The glide slope antennas are mounted on a tower that is located approximately 500 feet to one side of the runway center line at a distance of approximately 1000 feet from the approach end of the runway (see figure 3-1, CAT I ILS System Placement).

(1) Ultra High Frequency (UHF) Glide Slope Station. The basic UHF glide slope station will be a single frequency design for use in the null reference configuration. The glide slope chassis or cabinet will be mechanically designed and prewired to accept additional modules which will convert the basic null reference configuration to either a sideband reference or capture effect

configuration. A complete null reference UHF glide slope station consists of the following:

(a) Transmitter group with associated modulation and control equipment with a backup battery power supply system for the glide slope station.

(b) A complete glide slope antenna group consisting of two identical directional transmitting antennas, including power divider networks, with integral monitoring probes and combining networks, associated cabling and antenna tower.

(c) A monitor group that contains circuitry to monitor glide slope functions. If a station fault persists for a preset period, the monitor will cause radiation of the glide slope transmitter to cease and, following shutdown, initiate a local aural and visual alarm and transmit the alarm to the remote control point.

(2) Glide Slope Capture Effect Conversion Kit. The capture effect conversion kit provides the necessary hardware to modify a null reference slide slope to overcome glide slope upslope terrain siting problems.

(3) Glide Slope Sideband Reference Conversion Kit. The glide slope sideband reference conversion kit provides the necessary hardware to modify a null reference glide slope to overcome glide slope siting problems where there is a steep terrain drop-off less than 1,000 feet in front of the antenna.

c. Middle and Outer Marker. Middle and outer marker functions are performed by 75 Megahertz VHF transmitters modulated by audio tones to mark positions along the approach course. The middle marker is located approximately 3,500 feet from the ILS runway threshold in line with the approach, while the outer marker lies along the same approach approximately five nautical miles from the ILS runway threshold (see figure 3-1).

(1) Marker Beacon Station. A complete single equipment marker beacon station consists of the following:

(a) Transmitter group with associated monitor, modulation equipment, with keyer and audio frequencies that can be selected so it may be used as either a middle or outer marker.

(b) One antenna group with monitor pickup device and associated cabling, divider networks, connectors, and hardware, that are necessary to connect the transmitter to the antenna array and to mount the antenna to the tower.

(c) One standby battery power group.

(d) Antenna support tower.

(2) Marker Beacon Station Performance. The marker beacon station provides an indication of the distance to the runway threshold for an aircraft engaging in an approach to, and landing at an airfield. The monitor will provide an alarm and automatically shut down the transmitter under the following conditions:

(a) RF power drops below a preset threshold.

(b) Identification tone or keying is not present.

d. ILS Status and Control Unit. The ILS status and control unit is usually mounted in the equipment room of an air traffic control tower (ATCT) and is connected to the localizer, glide slope, and markers (only where required by regions) by voice grade telephone lines, fiber optics, or radio link. The interconnection of facilities will be accomplished by the region. The remote status and control unit provides the following functions:

(1) Visual indication of the status of the localizer, glide slope and the marker beacon stations (if monitored) by using a green "normal" and red "alarm" (abnormal) indicator light for each facility.

(2) An aural alarm that operates simultaneously with the operation of the red "alarm" lights to indicate an abnormal condition of the localizer, glide slope or either marker beacon station (if monitored).

(3) An alarm silence switch.

(4) Remote "on" and "off" controls for the localizer and glide slope station.

(5) Outputs to provide status information to the status unit.

(6) A dimmer control for all green "normal" indicating lights.

(7) A two-terminal input, for the purpose of interlocking two or more ILS's by the use of external equipment (not to be supplied under this procurement).

(8) Two spare monitor channels identical with those provided for the marker beacon stations.

e. ILS Status Unit. The ILS status unit is typically mounted in the airport control tower cab and provides the following functions:

(1) Visual indication of the status of the localizer, glide slope and the two marker beacon stations (if monitored) by using green "normal" and red "alarm" indicator lights slaved to the indicator lights of the remote status and control unit.

(2) An aural alarm that operates simultaneously with the operation of any of the red "alarm" lights to indicate an abnormal condition of the localizer, glide slope or either marker beacon station (if monitored).

(3) An alarm silence switch.

(4) Two spare status indicator channels identical with those supplied for the marker beacon stations.

f. Remote Maintenance Monitoring (RMM). The CAT I ILS contract and specification to which the equipment is built, requires remote maintenance monitoring. Operational requirements for the RMM system are given in Remote Maintenance Monitoring System Interface Control Document, NAS-MD-792 and NAS-SS-1000 Vol. I, Appendix III. Functional requirements for the RMM system are given in Operational Requirements for Remote Maintenance Monitoring System, NAS-MD-793.

(1) ILS Remote Maintenance Monitor. The CAT I ILS RMM will consist of a link control unit (LCU), an embedded remote monitoring subsystem (RMS), various embedded sensors and built in test equipment necessary to monitor, control, record and certify proper operation of the subsystems comprising the instrument landing system. It will include provisions for monitoring environmental conditions. A land line or RF link is required. The CAT I ILS RMM's LCU interface to the maintenance processor subsystem (MPS) will be in accordance with the requirements of NAS-MD-790.

(2) Link Control Unit. The LCU provides a hub, typically at an airport control tower, through which several ILS RMS units communicate with an MPS, typically located at an air route traffic control center (ARTCC). The LCU stores data necessary for certifying ILS subsystem performance and, when requested by the MPS, forwards this data to or acts upon commands from the MPS. The LCU is a generic item within the FAA. If an LCU exists at a site as part of another RMM project, it will be used with the ILS RMM, and another LCU will not be required. It has not yet been determined whether LCU's will be purchased under the same contract as ILS equipment, or whether LCU's, where required, will be provided from another contract.

(3) Remote Monitoring Subsystem. The RMS consists of the various embedded sensors and internal monitoring points required for sampling signals from the ILS equipment units, an interface unit (if required) to buffer or preprocess the sampled signals, and a data acquisition system for digitizing, formatting and transmitting the

processed signals to the LCU or the MPS on a periodic or programmable basis or to the MPS upon request. Operational requirements for the RMS are given in NAS-MD-792 and the functional requirements are given in NAS-MD-793. Environmental parameters will be monitored.

(4) Terminal Interface. The LCU and each CAT I ILS subsystem will be provided with a terminal interface that is in accordance with EIA Standard RS-232C and compatible with the FAA standard portable maintenance data terminal (MDT).

(5) Fault Diagnosis. The RMM function will initiate built-in diagnostics on command. The diagnostics will be automatically initiated when a failure is detected. Diagnostics can also be initiated manually from the local terminal port or from the MPS to provide more detailed information on the subsystem status.

(6) Telecommunications Connectivity. The telecommunication connectivity between the CAT I ILS RMS and the LCU will provide two-way transmissions and reception in accordance with established LCU to RMS interface control standards, namely NAS-MD-792, Operational Requirements for Remote Maintenance Monitoring Systems; and NAS-MD-793, Remote Maintenance Monitoring System Functional Requirements for Remote Monitoring Subsystems.

g. Coaxial Cabling. Coaxial cabling will be provided for glide slope antennas and individual localizer elements.

31. PHYSICAL DESCRIPTION. Equipment purchased for this project will be functionally equivalent to existing ILS equipment, but will probably be physically smaller due to more advanced construction techniques and higher level of integration.

a. Localizer. The localizer equipment will be housed in a cabinet type rack with top openings and easily removable covers for cable entrances. The localizer antenna array will be similar in construction to existing 8-element and 14-element log periodic arrays, and will be capable of being mounted on an elevated support structure up to a height of 25 feet above ground.

b. Glide Slope. The glide slope equipment will also be housed in a cabinet type rack with top openings and easily removable covers for cable entrance. The antenna support will be a nominal 35 or 50 foot self-supporting steel tower. The tower will contain a ladder and will be supplied with safety climbing equipment in accordance with Occupational Safety and Health Administration (OSHA), obstruction lights and will include associated cables and connectors.

c. Marker Beacon. The marker beacon transmitter, monitor and battery charger/power supply will be housed in a cabinet designed to be mounted inside the marker beacon shelter. The cabinet will be vented as required for adequate convection cooling with RF screening

as required to meet equipment performance requirements. The marker beacon antenna support will be a self-supporting steel tower.

d. ILS Status and Control Unit. The ILS status and control unit will be designed for mounting in a standard 19 inch relay rack. Panel height will not exceed 7 inches and the depth will not exceed 9 inches, excluding connectors.

e. ILS Status Unit. The ILS status unit will be a completely enclosed metal container designed either for desk top mounting or for installation within a rectangular cut-out in an operating console. Visual indicators will be of a sunlight readable type.

32. SYSTEM REQUIREMENTS.

a. Power Requirements.

(1) Primary Power. The localizer, glide slope, and marker beacon equipment will be designed to operate from a nominal 120 V, 60 Hertz, three-wire, single-phase AC power source. Current requirements is specified to be 15 amperes or less for a complete station.

(2) Standby Power. The localizer, glide slope, and marker beacon stations will each contain a standby battery power system. The batteries will provide continuous normal operation of the localizer and glide slope for not less than four hours and the marker beacon station for not less than one week. No maintenance, non-liquid electrolyte, non-gassing batteries will be provided. A suitable housing will be provided for batteries.

b. Modularity. The ILS design will make maximum use of easily removable plug-in module assemblies containing one or more related circuits.

c. Interchangeability. Due to the high degree of functional commonality between stations, various assemblies of the ILS will be designed to maximize module interchangeability.

d. Maintainability. The localizer, glide slope, and marker beacon stations will have a mean time to repair (MTTR) of 30 minutes or less and a maximum maintenance time of 45 minutes. The equipment will not require any manufacturer specified preventive maintenance beyond maintenance procedures directed in the Order 6750.49, Maintenance of Instrument Landing Systems (ILS) Facilities.

e. Reliability. The localizer and glide slope stations will each have a specified mean time between failure (MTBF) of not less than 4,000 hours. Each marker beacon station will have a specified MTBF of not less than 10,000 hours.

33. INTERFACES. The CAT I ILS will interface with the MPS in accordance with Interface Control Document (ICD) NAS-MD-790, Remote Maintenance Monitoring System Interface Control Document.

34.-39. RESERVED.

CHAPTER 4. PROJECT SCHEDULE AND STATUS

40. PROJECT SCHEDULES AND GENERAL STATUS. The procurement of the CAT I ILS equipment will provide systems for delivery starting with the first site in October 1995 and ending in October 1998. See appendix 1 for a list of CAT I ILS replacement sites. A list of locations for CIP CAT I ILS deliveries is being developed by the Flight Standards Service.

41. MILESTONE SUMMARY SCHEDULE. The current project schedule is shown in Table 4-1, Milestone Summary Schedule. Project events will be scheduled in relationship to the date of contract award. The dates listed are for anticipated milestones. This table is by no means an all inclusive list of project milestones necessary for project completion.

TABLE 4-1. MILESTONE SUMMARY SCHEDULE

EVENT	DATE
Contract Award	November 1992
Preliminary Design Review	April 1993
Critical Design Review	October 1993
First system delivered to T & E site	November 1994
First system delivered to operational site	October 1995
Last system delivered to operational site	October 1998

42. INTERDEPENDENCIES AND SEQUENCE. The following projects were identified as having interdependencies with the CAT I ILS project. Because of the broad variation in site requirements, discussion of specific effects of each program on a site-by-site basis is beyond the scope of this PIP.

a. The Airport Cable Loop Program. The Airport Cable Loop Program establishes a network of all the airport's power and control cables. The CAT I ILS projects may precede the Airport Cable Loop Program at some locations. The localizer and glide slope sites for this project will each require a single pair of voice grade telephone lines or the equivalent to interface with the remote status and control unit located in the ATCT equipment room. If an additional line pair is available, it can be used for the RMS-to-LCU connection. Otherwise, a radio link may be used; radio links are not part of this procurement. Fiber optic interfaces have not been well enough defined to include as part of the specification for equipment purchased for this project.

b. The Airport Telecommunications Program. The Airport Telecommunications Program will establish the specifications and criteria for a reliable and flexible distribution system for low activity and medium activity airports. It is related to all airport projects that require buried cable for control signals or communications between sites. The Airport Telecommunications Program investigates frequency interference and alternative communications media within the CIP. The CAT I ILS impacts this program between the subsystems and the control facility.

c. Remote Maintenance Monitoring Program. Equipment purchased for this program will include RMM capability. An RMM ICD will be developed under the technical guidance of the Maintenance Automation Associate Program Manager for Engineering, ANA-120, and will be provided by the hardware contractor for use by the National Automation Engineering Field Support Division, ASM-400, to develop a software interface for this new equipment into the Maintenance Processing Subsystem.

43.-49. RESERVED.

CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. This chapter describes the organizations within the Office of the Program Director for Navigation and Landing that are directly responsible for ILS project management.

a. Program Director for Navigation and Landing (ANN-1). The Program Director for Navigation and Landing manages, directs, and executes the FAA's engineering and management activities related to facilities design, air navigation, landing aids, and air traffic control facilities and equipment to ensure that the NAS is efficient, economical, and responsive to operational needs.

b. Navigation and Landing Engineering Division (ANN-100). This division is the principal element of the service responsible for the design, development, and implementation of systems, programs and facility requirements for navigation and landing systems.

c. Associate Program Manager for Engineering (ANN-120). The Associate Program Manager is the principal element of the division responsible for design, development, and implementation of ILS's.

d. Program Manager for Landing (ANN-200). The Program Manager for Landing is the principal element of the Directorate responsible for managing the procurement of Landing Systems. These responsibilities include:

(1) Management. Planning, scheduling and managing the program from design through commissioning, logistics support, training, and program completion. Responsible for CAT I ILS systems engineering, system design, man-machine interface, component design and related functional, technical, and performance characteristics. Acts as chairman of the National Airspace Integrated Logistics Support Management Team (NAILSMT). The program office will provide each region with updated specification and/or contract modifications for the equipment.

(2) Equipment and Spares Provisioning. Provides, in conjunction with the Acquisition Support Service and Systems Maintenance Service, technical guidance to define logistics support for proper provisioning of equipment.

(3) Modernization Input. Developing service input for the modernization or in-service improvement of equipment.

(4) Technical Officer. Providing engineering advice and consultation to the contracting officer during procurement, serving as Contracting Officer's Technical Representative, and reviewing contractor requests and progress payments.

(5) Cost Data. Developing and providing cost data, controlling assigned funds, and adjusting program schedules and objectives as necessary.

(6) Technical Installation Instructions. Preparing technical installation instructions.

(7) Maintenance Instructions. Preparing maintenance instructions, identifying training, provisioning and test requirements, and directing the preparation of maintenance technical handbooks.

(8) Testing. Reviews and approves manufacturers' equipment and RMM test procedures. Establishes requirements and approves plans for test and evaluation of engineering activities of the FAA Technical Center.

(9) Inventory. Manages in-transit material for construction and installation. Maintains currency of material systems and control over equipment inventory.

(10) Installation. Management of installation activities for current and future systems to assure a high level of system and RMM performance.

(11) Acceptance. Providing research, engineering, development, design and systems analyses associated with acquisition and acceptance of hardware and software.

e. Associate Program Manager for Testing (ACD-330). The Associate Program Manager for Testing (APMT), will assume all testing responsibilities as contained in Order 1810.4A, FAA NAS Test and Evaluation Program.

f. Associate Program Manager for Logistics (ANS-200). The Associate Program Manager for Logistics (APML) is responsible for ensuring all applicable NAILS element requirements are managed and integrated into all new NAS subsystems and equipments and facilities in a manner which provides for total life-cycle supportability.

g. Associate Program Manager for Contracting (ASU-310). The Associate Program Manager for Contracting (APMC) is a contracting officer with the authority to enter into, administer, or terminate contacts and make related determinations and findings to the program manager.

h. Associate Program Manager for Quality (ASU-420). The Associate Program Manager for Quality (APMQ) performs onsite, in-plant quality and reliability support at contractors' and subcontractors' facilities and performance locations in support of the program manager.

51. PROJECT CONTACTS. This paragraph lists CAT I ILS project contacts and their addresses.

a. Program Director for Navigation and Landing. Rod Gill, ANN-1, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, FTS 267-6531, (202) 267-6531.

b. Navigation and Landing Engineering Division. Reuben Powell, ANN-100, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, FTS 267-6511, (202) 267-6511.

c. Program Manager for Landing Systems. Gary Skillicorn, ANN-200, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, FTS 267-6675, (202) 267-6675.

d. Associate Program Manager for Landing. Ken Harris, ANN-120, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, FTS 267-6563, (202) 267-6563.

e. Project Engineer. Mike Rivers, ANN-120, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, FTS 267-6543, (202) 267-6543.

f. Associate Program Manager for Logistics (APML). Frances Wirtanen, ANS-420, Federal Aviation Administration, 800 Independence Ave S.W., Washington, D.C., 20591 (202) 267-5839.

52. PROJECT COORDINATION. The CAT I ILS project requires coordination with other services within the FAA and with regional representatives. Coordination by and with the organizations below is essential for them to accomplish their functions.

a. Maintenance Engineering Division (ASM-100). ASM-100 has reviewed procurement specifications to ensure the design meets the reliability and maintainability requirements and supports the general maintenance philosophy. ASM-100 will coordinate the development of an integrated logistic support plan for the CAT I ILS acquisition and develop maintenance standards and plans for implementation of maintenance concepts. They also provide test equipment for new establishment projects.

b. Maintenance Operations Division (ASM-200). ASM-200 participates in the development and review of maintenance plans. In addition, ASM-200 develops national airway facilities sector staffing standards for the CAT I ILS program and validates maintenance staffing requirements, and personnel certification. The program manager ensures the project is in conformance with staffing, training, certification policies, guidelines and requirements.

c. Telecommunications Management & Operations Division (ASM-300). ASM-300 provides the connectivity for the RMM data between the installed sites and their designated MPS. The ILS Project Office will provide ASM-300 with telecommunications service requests for connectivity between each CAT I ILS and their designated MPS.

d. National Automation Engineering Field Support Division, ASM-400. ASM-400 participates in the development of a software interface for the new equipment's RMM into the Maintenance Processing Subsystem.

e. Spectrum Engineering Division (ASM-500). ASM-500 obtains frequency authorizations necessary to satisfy the requirements of the NAS. This division also provides engineering support to regional and field facilities in the resolution of and prevention of radio frequency interference to NAS facilities.

f. National Engineering Field Support Division (ASM-600). ASM-600 provides support in the development of shakedown test plans and produces the shakedown test plan for subsequent field testing that is site-specific. ASM-600 will conduct all initial shakedown testing, analyze the results of the tests and recommend actions needed to correct deficiencies. The regions will conduct subsequent field shakedown testing.

g. Maintenance Automation Associate Program Manager for Engineering, ANA-120. ANA-120 participates in the development and review of CAT I ILS Interface Control Document (ICD) to assure the CAT I ILS and LCU are in accordance with NAS-MD-790, and NAS-MD-793.

h. NAILS Implementation Branch (ANS-420). ANS-420 will coordinate the development of an integrated logistics support plan (ILSP) for the CAT I ILS acquisition.

i. NAS Support Division (ASM-700). ASM-700 develops, recommends and issues policy procedures, standards, and policies for material, supply and property management. This division also develops the required logistics policies, plans, and standards required to support the National Airspace Integrated Logistics Support (NAILS) process.

j. Contracts Division (ASU-300). ASU-300 does cost/price analyses of contractor's proposals and participates as a member of the Source Evaluation Board on CAT I ILS procurement subject to the contracting officer. In addition, ASU-300 provides procurement support for the ILS programs and plans, and places and administers contracts for the ILS equipment. ASU-300 also designates a contracting officer (CO) who is responsible for all contractual matters. The CO is the only individual authorized to approve contract changes affecting price, delivery or schedule.

k. Industrial Division (ASU-400). ASU-400 will provide an APMQ to provide the quality assurance service to the program manager (PM). ASU-400 also assigns a Quality Reliability Officer (QRO) who is the FAA's representative at the contractors's facility and is responsible for verifying quality control. After contract award, the assigned QRO will also serve as the APMQ. The QRO is directed by FAA policy and procedure, and by the terms and conditions of the contract. In addition, ASU-400 shall provide industrial engineering services as necessary to support the ILS Program.

l. Grants-in-Aid Division (APP-500). APP-500 directs the airport grant program and should be included in the coordination process to avoid conflicts that may arise because of pending airport project, including those where the airport may be purchasing its own ILS under the grant program.

m. FAA Logistics Center (AAC-400). AAC-400 manages the distribution of equipment for the ILS sites at the regions request. The FAA Logistics Center provides repair of items that require specialized repair procedures, test equipment/tools, diagnostic hardware/software, and major shop facilities. It also provides all other FAA Logistics Center functions as set forth in the NAILS Master Plan.

n. FAA Academy (AAC-900). AAC-900 evaluates and monitors the development and conduction of contractor training and provides maintenance and RMM training after completion of contractor training. AAC-900 will participate in workshops and meetings related to program implementation, NAILS and the Deployment Readiness Review (DRR) process.

o. Navigation/Landing/Surveillance System Engineering Division (ASE-300). ASE-300 serves on the ANN-1 Configuration Control Board (CCB) that maintains the CAT I ILS baseline during the acquisition phase, selects an Associate Program Manager for System Engineering (APMSE) for each project and provides system requirements validation for ILS.

p. Engineering Specialties and Configuration Management Division (ASE-600). Serves on the ANN-100 CCB that maintains the CAT I ILS baseline during the acquisition phase. Serves as secretariat for the Test Policy and Planning Review Board (TPRB) and verifies compliance with Order 1810.4A.

q. Concepts Analysis Division (ACD-300). Serves on the ANN-100 CCB that maintains the CAT I ILS baseline during the acquisition phase. Member of TPRB, selects the APMT for each project and provides Test and Evaluation (T&E) assessments to the DRR process. The APMT will provide all the responsibilities in Order 1810.4A and the CAT I ILS Master Test Plan.

r. Airway Facilities Training Program Division (AHT-400). AHT-400 analyzes training proposals prepared by ASM-200 and initiates action to meet training requirements.

s. Air Traffic Training Program Division (AHT-500). AHT-500 analyzes training proposals and initiates action to meet training requirements.

t. FAA Aviation Standards National Field Office. The FAA Aviation Standards National Field Office is responsible for providing the coordination to accomplish the following functions:

(1) Provides the support necessary for accomplishing the preliminary (preparatory) and commissioning flight inspections, as required.

(2) Determines if the operational status of a facility or system is in accordance with the established tolerances.

(3) Certifies the facility or system for operational use in the NAS when all operational requirements have been met.

(4) When applicable, ensures that required Notices to Airmen (NOTAM) will be issued for any facility or system restriction.

u. Flight Standards Service Planning and Program Management Branch, AFS-12. AFS-12 manages the prioritization and validation of facilities and equipment requirements for ILS.

v. FAA Regional Offices. The FAA regional offices through established administrative structures coordinate with all responsible parties to assure adequate funding, establish system commissioning/service availability dates, assign project field representatives and determine utility availability for the CAT I ILS. The regions also provide field engineering as required to support preparations for the installation of the ILS system. Orders government furnished materials (GFM), tools and test equipment to support installation and acceptance; tailor installation drawings to be site specific; initiate work orders and travel authorization; and assign field personnel. The region will purchase equipment shelters with lightning protection if required. The following regional offices are responsible for the coordination required to accomplish the functions listed below:

(1) Regional Airway Facilities Division (AXX-400).

(a) Installing facilities systems and equipment in accordance with established standards, specifications and instructions.

(b) Notifying the appropriate sector that a project has been funded and issuing a projected implementation schedule.

(c) Providing the sector an opportunity to review and participate in project plans during the engineering phase and for furnishing the sector a copy of the engineering plans and contract documents.

(d) Providing the sector a copy of the project work order at least 10 days before the start of project work.

(e) Providing the appropriate facility reference data file (FRDF) information to the sector for inclusion in the FRDF.

(f) Providing the essential facility, system, and equipment technical reference and performance parameters as part of the project transmittal when maintenance technical handbook parameters are not available.

(g) Ensuring that modifications, configuration control documents (CCD), manufacturer's field changes and factory changes are current and documented for equipment received from sources outside the Airway Facilities Sector.

(h) Notifying the joint acceptance board chairman of when the facility will be ready for Joint Acceptance Inspection (JAI), providing the sector all data necessary to prepare warranty failure reports on items failing prior to JAI, and providing regional Airway Facilities Division representatives for participation in the JAI.

(i) Establishing and maintaining a follow-up file for monitoring and clearing all JAI report exceptions, reviewing all JAI reports and follow-up reports for correctness, completeness and proper distribution, taking appropriate and timely actions to clear JAI report exceptions, and identifying additional sources of funds or initiating budgetary action, as necessary, to clear exceptions.

(j) Establish in conjunction with flight standard procedures personnel, a realistic commissioning chart date, flight inspection and any corresponding NOTAM.

(k) Notifying the regional Airports Divisions of the intent to establish an ILS at an airport and to coordinate with the Division to avoid any conflict with actual or proposed airport development at that airport.

(2) Airway Facilities Sector.

(a) Reviewing contract documents and engineering plans during the engineering phase and providing comments to the regional Airway Facilities Division.

(b) Providing personnel as required at appropriate times throughout the project to witness and/or participate in construction, installation, tune-up, tests, and collection of technical reference data.

(c) Coordinating the release of equipment currently in use to regional Airway Facilities Division establishment personnel for use in the project.

(d) Properly maintaining those components of an existing facility that are unaffected by an improvement project.

(e) Ensuring that modifications/CCD's and documentation are current on installed equipment for the purpose for which the equipment was being used prior to the project.

(f) Providing a representative to serve as the joint acceptance board chairperson and other qualified personnel for participation in the JAI, preparing and distributing the JAI report, and assuming maintenance responsibilities and custodianship for facilities, systems, or equipment at the conclusion of JAI.

(g) Coordination and follow-up on exceptions after the JAI to include exceptions assigned to other organizations or to a contractor for clearance, clearing exceptions that have been assigned to the sector, reporting the clearance of exceptions, and reviewing all waived exceptions to determine if actions will impact sector operations or other organizations.

(h) Maintaining all equipment warranty information and reporting equipment failing under warranty.

(i) Receiving, storing, and shipping project materials and disposing of excess equipment and materials.

(j) Participate in all phases of commissioning and initiate the official notification of commissioning.

(3) Regional Logistics Division (AXX-50). Provide representatives to participate in specific projects that the regional Airway Facilities division has identified as having major logistical problems and has requested the participation by the regional Logistics division.

(4) Regional Flight Standards Division (AXX-200). Provide technical expertise to the regional Airway Facilities, as required, for accomplishing JAI's and the commissioning of facilities and systems.

w. Contractor. The equipment manufacturer contractor, when requested by ANN-120, provides engineering support services for onsite advice, including technical supervision to FAA technicians and the installation contractor concerning proper installation, maintenance and operation of CAT I ILS.

53. PROJECT RESPONSIBILITY MATRIX. Figure 5-1, Project Responsibility Matrix, illustrates the FAA organizations responsible for the implementation of each significant function of the CAT I ILS project.

54. PROJECT MANAGERIAL COMMUNICATIONS. The CAT I ILS project manager within ANN-120 is the focal point for all internal project communication. Organizations supporting the project designate a representative to maintain close communication with the ILS Program Office. Supporting organizations maintain communications within the FAA but never directly with the contractor without the contracting officer's permission. The meetings listed below are the regularly scheduled project meetings, or conferences.

a. NAILS Conferences. NAILS conferences are held to ensure that there is an interrelated, unified and iterative approach to the managerial and technical activities that support the NAS. During these conferences issues that affect logistics management, maintenance planning, supply support, test and support equipment, manpower and training support, support facilities, technical data, packing, handling, storage and transportation are discussed and resolved. These meetings can be held at the FAA headquarters, FAA Logistics Center or contractor facility on an annual basis. Guidance can be found in the FAA NAILS Master Plan and Order 4560.1B, Policies and Procedures Covering the Provisioning Process During the Acquisition of FAA Material.

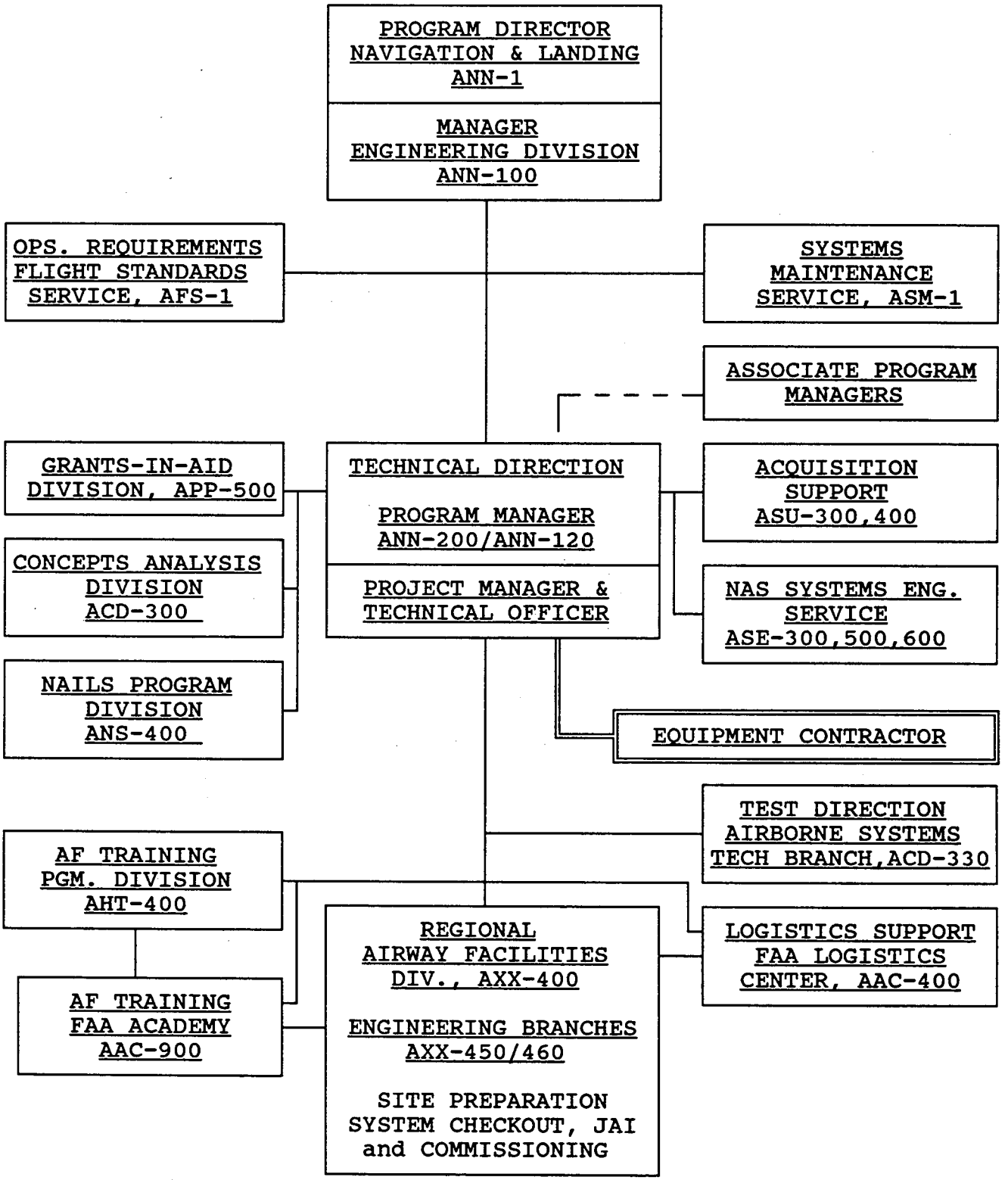
b. Program Directors Status Review (PDSR). PDSR meetings are held every two months at the FAA headquarters to discuss project status and to resolve problems and issues affecting all phases of the project from the time the requirements are established until system deployment has been completed.

55. IMPLEMENTATION STAFFING. There are no personnel requirements peculiar to the implementation phase of the project.

56. PLANNING AND REPORTS.

a. Planning. For project planning purposes each region should provide the ILS program office, ANN-120, with a prioritized list of

FIGURE 5-1. PROJECT RESPONSIBILITY MATRIX



Mark 1A, B, C and Mark 12 locations for replacement, keeping in mind that replacements will have RMM capability. The regional lists will be combined to develop the prioritized replacement delivery schedule for the project.

b. Reports. No reports are required for this project.

57. APPLICABLE DOCUMENTS. Within this order the following documents are applicable.

a. FAA-E-2492/2c, Specification, Category I Instrument Landing System, Equipment Requirements, November 30, 1990.

b. FAA-STD-036, Preparation of Project Implementation Plans, March 11, 1987.

c. NAS-DD-1000B, Level I Design Document, May 1986.

d. NAS-MD-110, Test and Evaluation (T&E) Terms and Definitions for the National Airspace System, March 27, 1987.

e. NAS-MD-790, Remote Maintenance Monitoring Interface Control Document.

f. NAS-MD-792, Operational Requirements for Remote Maintenance Monitor System.

g. NAS-MD-793, Remote Maintenance Monitoring System Functional Requirements for Remote Monitoring Subsystem (RMS).

h. NAS-SS-1000, NAS System Specification, Volume I, Appendix III and Volume V.

i. Manual, National Telecommunications Information Administration Manual, Regulations and Procedures for Federal Radio Frequency Management.

j. Order 1800.8E, National Airspace System Configuration Management, July 11, 1985.

k. Order 1800.58, National Airspace Integrated Logistics Support (NAILS) Policy, July 2, 1987.

l. Order 1810.4A, FAA NAS Test and Evaluation Program, February 14, 1989.

m. Order 3400.3E, Airway Facilities Maintenance Personnel Certification Program, August 4, 1978.

n. Order 4560.1B, Policies and Procedures Covering the Provisioning Process During the Acquisition of FAA Material, March 10, 1989.

o. Order 6000.15A, General Maintenance Handbook for Airway Facilities, October 26, 1988.

p. Order 6030.45, Facility Reference Data File, February 11, 1987.

q. Order 6200.4D, Test Equipment Management Handbook, September 16, 1985.

r. Order 6750.49, Maintenance of Instrument Landing Systems (ILS) Facilities, April 10, 1989.

58.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. PROJECT FUNDING STATUS, GENERAL. Funding for the FY 1990 CAT I ILS procurement is supplied under CIP's 34-06 and 44-22 and it is anticipated that funds will be available when needed. The regions will provide cost estimates to the program office, who will supply project funding prior to equipment delivery.

61.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS. Deployment of CAT I ILS's is administered by the program manager and staff. The first system will be shipped to the T&E site for operational and RMM testing. After completion of integration/shakedown testing and a successful DRR, subsequent systems will be tested at the contractor's plant and shipped at FAA expense to each designated site by Government Bill of Lading (GBL). Installation of the equipment is the responsibility of the region and other recipient organizations. Table 7-1, CAT I ILS DRR schedule, depicts the DRR schedule.

TABLE 7-1. CAT I ILS DRR SCHEDULE

EVENT	DATE
Delivery to T&E Site	November 1994
Shakedown Testing Complete	April 1995
Excom Meeting	May 1995

71. SITE PREPARATION. The regions and other recipient organizations are responsible for preparing the sites where CAT I ILS equipment will be installed. Site preparation includes planning for installation and integration with other inter-related subsystems. Considerations for site preparation include weather conditions and concurrent construction activities. Headquarters will provide the regions with an installation document which outlines the regional responsibilities and what is to be accomplished for site preparation and acceptance six (6) months prior to equipment delivery to the site.

72. DELIVERY. The CAT I ILS will be direct shipped as an entire system to the site or storage facility where it will await installation. The GBL will include provisions for unloading and the region should make preparations to provide storage (if necessary). Projected equipment delivery dates are contained in Chapter 4, with the last delivery scheduled for October 1998. Implementation of the project is scheduled to be completed in April 1999.

73. INSTALLATION PLAN. The FAA regions or other recipient organization will coordinate the receipt, installation and evaluation of all equipment required to form the CAT I ILS. The CAT I ILS will be installed in accordance with national standard drawings and standards, tailored to fit the individual site. The regional office will coordinate the complete installation, alignment, and operational tests on all identified interfaces to assure full compliance with FAA

specifications and performance. If required, the contractor will be available to provide engineering support services for onsite advice, including technical supervision to FAA technicians and the installation contractors. Contractor support may be requested through the program office.

74. CONFIGURATION MANAGEMENT PLAN. Configuration management is the process used to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, and record and report change processing and implementation status. The configuration management discipline will be applied to all configuration items included in the CAT I ILS baseline to ensure compatibility between elements within the ILS. All additions and changes to the CAT I ILS baseline will be proposed in a case file, and will be reviewed for recommended approval or disapproval by a CCB. All changes to the NAS site design baseline must be processed and approved by the Navigation and Landing CCB.

a. Acquisition Phase Configuration Management.

(1) The Navigation and Landing CCB controls the establishment of and changes to the CAT I ILS hardware baseline during the acquisition phase. For CAT I ILS matters, the CCB will include members from ANN-120, ASM-600, ASM-500, ASM-200, ASM-100, ASE-300, ASE-500, ACD-300, ACN-200, AVN-500, ANS-100, AAC-400, AAS-100, AFS-400, ASU-300, ASU-400, ANC-1, AOV-100, ATR-100, SEI, and the Configuration Management Division, ASE-600. The CCB is responsible for ensuring that the functional, performance, and interface requirements allocated to the CAT I ILS hardware subsystems are reflected in the baseline, and in any changes to those baselined, until product acceptance. The CCB is also responsible for ensuring that baseline documentation is accurate and reflects CAT I ILS operational requirements. Baseline documentation includes specifications and ICD's. The CCB retains this configuration management responsibility until the hardware installation is commissioned at each site.

(2) The transition of configuration management responsibilities associated with CAT I ILS hardware products occurs at acceptance by the CCB designated representative of the contractor's delivered, installed, integrated, and tested hardware product. Hardware product acceptance is based on successful operational readiness demonstration (ORD) of the complete ILS system.

(3) At product acceptance, the change control functions and CCB records associated with hardware products that affect Level III drawings and instruction books transition from the CCB to the Maintenance Engineering (ASM-100) CCB.

b. Operational Support Phase Configuration Management.

(1) During the operational support phase, and for the entire life-cycle of the implemented hardware enhancements, configuration management functions will consist of maintenance and change control management of site and product baseline (Level III Design).

(2) The ASM-100 CCB assumes baseline and change control management of all CAT I ILS installations as they are commissioned for operational service and of related NAS site design baseline (including logistics and training). The ASM-100 CCB is responsible for change control management of the CAT I ILS hardware product baseline. Hardware product baselines are maintained by the National Airway Engineering Field Support Division (ASM-600) personnel for the field. The contractor will provide all engineering changes to ASM-600 when the changes are released and prior to implementation in the field. ASM-600 will evaluate the changes and approve the change for field implementation via the NAS Change Proposal (NCP) process. RMM software and/or firmware baselines are maintained by the National Automation Engineering Field Support Division, ASM-400, personnel for the field. The contractor will provide all RMM engineering changes to ASM-400 prior to implementation in the field. ASM-400 will evaluate the changes and approve the change for field implementation via the NCP process. The configuration management functions assigned to the ASM-100 CCB are described in the ASM-100 CCB charter.

75.-79. RESERVED.

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION. The CAT I ILS contractor will perform design qualification, type tests and production tests using a complete ILS to validate and demonstrate that the requirements of specification FAA-E-2492/2c and the contract are met. These tests will verify that all hardware, software, and performance requirements are met before the FAA accepts a system from the contractor.

81. CHECKOUT. After installation of equipment by the regions, FAA personnel will conduct checkout tests in accordance with the procedure contained in the contractor developed equipment instruction books. The procedures followed will include testing of electrical and mechanical hardware interfaces, verifying system and RMM performance, testing of interfaces with diagnostics and verifying maintenance capability and the adequacy of support hardware and software. The test procedures will be made available to the regions six (6) months prior to equipment delivery to the site.

82. CONTRACTOR INTEGRATION TESTING. Not applicable.

83. CONTRACT ACCEPTANCE INSPECTION (CAI). Not applicable.

84. FAA INTEGRATION TESTING. These tests are conducted to verify that the CAT I ILS system has been integrated as specified and that it can interface with the specified external systems. Included are tests that verify the operation of multiple interfaces and integration with other systems in the operational and RMM environment. At the completion of integration testing the CAT I ILS should be adapted to parameters of the operational equipment with which it must interface.

a. NAS Verification. Specifically testing NAS-SS-1000 Volume I (including appendix III) and Volumes II through V subsystem level requirements as identified in the project Master Test Plan (MTP) Verification Requirements Traceability Matrix (VRTM).

b. Integration Testing. Integration testing between the existing NAS system and the new subsystem, while reverifying top-level functional requirements will also establish baseline operational performance values with no degradation to the NAS operational environment. The test procedures will be made available to the regions six (6) months prior to equipment delivery to the site.

85. SYSTEM SHAKEDOWN AND CHANGEOVER. Shakedown testing is the exercising, test and evaluation of a system in an operational environment to support a determination that the system is ready for full operation and RMM capability as part of the NAS. System shakedown permits facility personnel to become familiar with the system and the RMM capability, learn its limitations, and to become

proficient on the system. This includes testing and evaluation to confirm that when the system is operated and maintained by operational personnel in the operational environment all requirements are met. In other words, shakedown testing should reflect the integrated readiness of people, procedures and the system to assume field operational status. The shakedown test is to be accomplished on the first operational system in a field environment. Twelve major areas will be evaluated by the shakedown test team as follows:

a. Hardware/Software Compatibility.

b. Remote Maintenance Evaluation.

c. Equipment Performance.

d. Signal in Space.

e. Modifications.

f. Test Equipment.

g. Installation.

h. Technical Documentation.

i. Logistics.

j. Environmental.

k. Facility Safety and Security.

l. Training.

Any discrepancy found or improvement required will be described as being either significant or critical in nature. A significant discrepancy is considered as one that does not require correction before beginning system deployment, but resolution is strongly recommended soon after. A critical discrepancy is considered as one that does require resolution before system deployment is recommended.

86. JOINT ACCEPTANCE INSPECTION (JAI).

a. A JAI is conducted in accordance with Order 6030.45, Facility Reference Data File to gain the consensus of involved offices that the CAT I ILS project has been completed in accordance with applicable standards and specifications and that the facilities are capable of providing the operational and RMM services required within established standards and tolerances. After the successful completion of JAI and commissioning, the local AF technical representative assumes responsibility.

b. The JAI ensures compliance with requirements in the following areas:

(1) Facility Construction and Equipment Installation.

(2) Facility/System/Equipment Performance.

(3) Facility Technical Performance Documentation and Maintenance Reference Data.

(4) Trained Technicians

(5) Facility Logistics Support.

(6) Final Acceptance and Commissioning.

87.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT. The FAA is responsible for on-site and depot level maintenance of CAT I ILS equipment procured by this project.

a. Site Maintenance. Site maintenance technicians will perform periodic maintenance in accordance with Order 6750.49, replace CAT I ILS components down to the line replaceable units (LRU) and may perform limited repair/corrective maintenance functions on-site. Each site will have a set of printed circuit replaceable boards and one set of spare LRU's. Maintenance technicians will use the RMM capability to monitor, maintain, and control the CAT I ILS to minimize travel time in accordance with Maintenance Automation objectives, procedures and policy.

b. FAA Logistics Center Maintenance. FAA Logistics Center maintenance will consist of receipt and repair/replacement of failed LRU's. For repair and testing of these units a "hot" test-bed will be required by the FAA.

c. Maintenance Plan. The Maintenance Plan for CAT I ILS will be contained in the Integrated Logistics Support Plan (ILSP) that will be published in accordance with Order 1800.58, National Airspace Integrated Logistics Support (NAILS) Policy. The ILSP is a NAILS document.

91. TRAINING. The training program for the CAT I ILS is contained in the CAT I ILS Subsystem Training Plan. Assignment of training quotas for the regions will be made by ASM-200 for AF personnel. The projected training requirements by individual work centers/facilities and principal training milestones will be included in the training plan. Initial training of AF personnel required to maintain system coverage will be conducted by the contractor at the contractor's facility. Training courses will be developed and conducted for technicians who monitor and control, via RMM, and who do maintenance on CAT I ILS systems and FAA Academy (AAC-900) personnel who will be delivering academy resident training courses.

a. LRU Level. One course for LRU level training will be developed and will be taught five times. Training course graduates of this course will be able to configure the ILS system for normal operation and system testing using manufacturers instructions and FAA Handbook Specifications. They will possess sufficient knowledge to troubleshoot and repair to the LRU level and to perform and document FAA required periodic maintenance. This LRU level course will be delivered to the AAC-900 for future follow-on training.

b. Component Level. A single component level repair engineering course will be developed and taught by the hardware contractor for the purpose of training support personnel who may

modify the equipment in the future. This component level course will be delivered to the AAC-900 for future follow-on training. The contract includes an option for an additional component level course to be taught by the contractor if needed.

c. Air Traffic. Air Traffic will receive a User's Guide and no training should be required.

92. SUPPORT TOOLS AND TEST EQUIPMENT. All supply support and spare parts-peculiar will be stored at the FAA Logistics Center. Test equipment is supported at the AF sector office having responsibility for the ILS facility.

a. The contractor will provide a list of the common tools, test/support equipment, interface devices and connectors required for maintaining CAT I ILS equipment at all levels of maintenance.

b. Special tools, test/support equipment, and special interface devices required to support the CAT I ILS will not be required. A portable ILS receiver and other ILS test equipment will be provided by ASM-100 for new establishment projects. Replacement projects will use existing test equipment.

93. SUPPLY SUPPORT. The FAA Logistics Center is responsible for providing supply support to the CAT I ILS in the area of procurement and storage and transportation of component parts (both common and LRU's). This responsibility also encompasses maintaining inventory records including the FAA Supply Catalog, and interfacing with the Federal Cataloging System. The FAA Logistics Center is also responsible for the repair of LRU's.

94. VENDOR DATA AND TECHNICAL MANUALS. Instruction books for the CAT I ILS system will be provided in camera ready form by the contractor and reviewed and printed by the FAA. Two sets of instruction books will be provided with each delivered ILS. Other technical manuals to be provided by the contractor include: reliability documentation, maintainability documentation, test procedures and drawings.

95. EQUIPMENT REMOVAL. The removed equipment including the Mark 1A, B, C and Mark 12 equipment will be returned to the FAA Logistics Center for cannibalization during the changeover period. The FAA Logistics Center will dispose of the old equipment when no longer needed. Certain equipment such as V-ring antenna elements and Mark 1E and F components, if replaced, may be retained by the regions to support other similar installations. The ILS systems replaced by this project will not be re-installed for commissioning at another site. The region should retain the LCU and any items that can be used.

96. EQUIPMENT NOT FURNISHED. The following is a list of equipment that may be required for a CAT I ILS but are not furnished under the equipment replacement effort of this project:

a. Equipment shelters with lightning surge protection.

b. Cabling from localizer and glide slope stations to the ATCT equipment room and ATCT control cab.

c. Portable ILS receiver (PIR).

d. Test equipment.

e. Coaxial cabling to localizer and glide slope antenna.

f. Detector cables to localizer antenna.

g. Antenna platforms (both ground level and elevated).

h. Glide slope antenna masts (at most locations).

All of the aforementioned will be required at existing and new facilities. If the resources at existing locations are not adequate, the regions will be able to use the standard procedures for ordering project material, as required, and will only receive Project Authorizations (PAs) for new site shelters. Procurement of plant and test equipment should be coordinated with ASM at the Washington Office level to ensure standardization and reduced procurement cost.

97. PERSONNEL CERTIFICATION. Personnel maintaining this equipment will require certification in accordance with Order 3400.3E, Airway Facilities Maintenance Personnel Certification Program.

NOTE: Implementation of the CAT I ILS system will require issuance of interim personnel certification until a mandatory date has been issued.

98. EQUIPMENT CERTIFICATION. Equipment certification for the CAT I ILS system will be in accordance with Orders 6750.49, and 6000.15A.

99. RESERVED.

APPENDIX 1. CAT I ILS REPLACEMENT SITES

(Including FY 1993 Non-Feds)

REG	ST	LOCATION	RW	ID	FY	LOC	GS	MK	
AAL	AK	BARROW	06	BRW	96	VR	NR	0	
		BETHEL	18	BET	93	VR	NR	1	MM
		CORDOVA	27	CDV	97	VR	NR	0	
		DEADHORSE	04	SCC	97	VR	NR	0	
		HOMER	03	HOM	95	N	--	0	LOC
		KETCHIKAN	11	ECH	95	VR	NR	0	
		KODIAK	25	ADQ	93	W	CE	0	
		NOME	27	OME	93	VR	CE	2	
		ST PAUL'S ISLAND	36	PAU	96	VR	NR	0	
		YAKATAT	11	YAK	96	VR	NR	2	
ACE	IA	BURLINGTON	36	BRL	96	W	CE	2	
		DUBUQUE	31	DBQ	95	VR	CE	2	
		MASON CITY	35	MCW	93	VR	NR	2	
		OTTUMWA	31	OTM	97	VR	NR	2	
	KS	WICHITA	19R	HOV	95	LPD	CE	2	RETAIN LPD
	MO	CAPE GIRARDEAU	10	CGI	97	VR	NR	2	
		CHESTERFIELD	08R	SUS	93	W	NR	2	
		COLUMBIA	02	COU	93	VR	CE	2	
		ST LOUIS	30L	BKY	96	W	NR	2	
	NE	SCOTTSBLUFF	30	BFF	96	VR	NR	2	
		GRAND ISLAND	35	GRI	98	VR	NR	2	
AEA	MD	SALISBURY	32	SBY	93	N	NR	2	
	NJ	MORRISTOWN	23	MMU	93	LPD	SB	2	RETAIN LPD
	NY	GLENS FALLS	01	GFL	95	N	CE	2	
	PA	DUBOIS	25	DUJ	95	N	CE*	2	
		HARRISBURG	08	CXY	95	W	CE*	2	TWA REPLACE
		HAZELTON	28	HZL	96	N	--	1	LOC OM
		JOHNSTOWN	33	JST	93	N	SB	2	
		LANCASTER	08	LNS	96	N	SB	2	
		PHILADELPHIA	27R	PDP	95	W	NR	2	
		PHILIPSBURG	16	PSB	97	N	CE*	2	
		REEDSVILLE	06	RVL	96	N	--	1	LOC OM
		WILLIAMSPORT	27	IPT	98	N	SB	2	
	VA	CHANTILLY	19L	SGC	95	W	CE	2	
		CHARLOTTESVILLE	03	CHO	95	N	SB	2	TWA REPLACE
		DUBLIN	06	PSK	98	N	SB	2	
		RICHMOND	16	RGJ	95	N	NR	2	
		STAUNTON	05	SHD	95	N	CE	2	TWA REPLACE
	WV	BLUEFIELD	23	BLF	95	N	SB	2	TWA REPLACE
		CLARKSBURG	21	CKB	98	N	SB	1	OM
		ELKINS	04	OUW	96	N	--	2	LDA

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Appendix 1

REG	ST	LOCATION	RW	ID	FY	LOC	GS	MK	
AEA	WV	HUNTINGTON	12	HTS	98	N	CE	2	
		LEWISBURG	04	LWB	95	N	SB	2	
		MARTINSBURG	26	EXW	97	VR	NR	2	
		MORGANTOWN	18	MGW	97	N	SB	2	
		PARKERSBURG	03	PKB	98	N	CE	2	
AGL	IL	BLOOMINGTON	29	BMI	95	VR	CE*	2	
		CARBONDALE	18	MDH	93	N	CE*	2	TWA REPLACE
		ROCK FALLS	25	SQI	95	VR	CE*	2	
		WAUKEGAN	23	UGN	93	N	NR	2	TWA REPLACE
		WEST CHICAGO	10	DPA	97	N	CE	2	
	IN	GARY	30	GYY	97	N	CE	2	
		JEFFERSONVILLE (ASI)	18	JVY	93	LPD	NR	2	RET. LPD
		LAFAYETTE	10	LAF	95	N	CE	2	
		VALPARAISO	27	VPZ	97	N	CE	2	
	MI	BENTON HARBOR	27	BEH	95	VR	NR	1	OM
		HOUGHTON	31	CMX	97	VR	NR	2	
		IRON MOUNTAIN	01	IMT	96	VR	NR	2	
		LANSING	28L	LAN	97	N	NR	2	
		MARQUETTE	08	MQT	96	VR	CE	2	
		PELLSTON	32	PLN	96	N	NR	2	
		PONTIAC	09R	PTK	95	VR	CE*	2	
		ROMULUS	27	DMI	93	W	NR	2	
		TRAVERSE CITY	28	TVC	98	N	NR	2	
	MN	HIBBING	31	HIB	96	VR	CE	2	
		INT. FALLS	31	INL	98	VR	NR	2	
		MINNEAPOLIS	11R	HKZ	95	W	CE	2	
		MINNEAPOLIS	22	SIJ	95	N	NR	2	
		ST PAUL	32	BAO	96	W	CE	2	
	ND	GRAND FORKS	35	GFK	96	VR	NR	2	
		JAMESTOWN	31	JMS	98	VR	NR	2	
		MINOT	31	MOT	98	VR	NR	2	
	OH	CLEVELAND	23L	HPI	98	N	SB	2	
		DAYTON	18	DAY	95	N	NR	2	
		RICHMONDHTS	23	CGF	95	VR	CE*	2	
	SD	ABERDEEN	31	ABR	98	VR	NR	2	
		PIERRE	31	PIR	95	N	CE*	2	
		WATERTOWN	35	ATY	98	VR	NR	2	
	WI	APPLETON (ASI)	29	AQZ	93	VR	CE	MM	RET. B/C
		EAU CLAIRE	22	EAU	98	N	NR	2	
		KENOSHA (ASI)	6L	ENW	93	N	CE	2	
		LACROSSE	18	LSE	98	N	NR	2	
		MILWAUKEE	19R	BLY	95	N	CE	2	
		MILWAUKEE	7R	GMF	95	N	CE	2	TWA REPLACE
		MOSINEE	08	CWA	98	N	NR	2	

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REG	ST	LOCATION	RW	ID	FY	LOC	GS	MK	
ANE	CT	GROTON	05	GON	98	N	SB	1	MM
		NEW HAVEN	02	HVN	93	W	SB	0	
	MA	BOSTON	15R	MDC	93	N	NR	0	TWA REPLACE
		LAWRENCE	05	LWM	95	N	CE	2	TWA REPLACE
		WESTFIELD	20	BAF	97	W	SB	2	
	ME	LEWISTON	04	LEW	96	N	CE	2	
		ROCKLAND	03	RKD	95	N	--	0	LOC
	VT	MONTPELIER	17	MPV	98	N	CE	2	
		RUTLAND	19	RUT	95	N	--	1	LDA FM
		SPRINGFIELD	05	VSF	96	N	--	0	LOC
		MANCHESTER		MHT	93			1	OM
ANM	CO	BROOMFIELD	29R	BJC	97	LPD	SB	2	RETAIN LPD
		DENVER	08R	GQW	98	LPD	NR	1	OM RET. LPD
		DENVER	17L	HMX	98	LPD	SB	1	MM RET. LPD
		DENVER FTRANGE(ASI)	26	FTG	93	N	CE	2	
		BOISE	10R	BOI	93	W	NR	2	
		IDAHO FALLS	20	IDA	95	VR	NR	2	
		LEWISTON	26	LWS	95	N	CE	2	
		TWIN FALLS	25	TWF	95	N	NR	2	
	MT	BOZEMAN	12	BZN	98	VR	NR	2	RET.VR W/O
		HELENA	27	HLN	93	N	CE	2	B/C
		KALISPELL	02	FCA	98	N	NR	2	
		MISSOULA	11	MSO	95	N	CE*	1	OM
	OR	NORTH BEND	04	OTH	93	LPD	SB	2	RETAIN LPD
	UT	SALT LAKE CITY	16L	BNT	95	W	NR	1	MM
	WA	EVERETT	16	PAE	95	W	SB	2	
		OLYMPIA	17L	OLM	96	N	NR	2	
		PASCO	21R	PSC	96	N	CE	2	
		TACOMA	17	TIW	98	N	SB	2	
		WALLA WALLA	20	ALW	97	W	CE	2	
	WY	SHERIDAN	31	SHR	97	N	CE	2	
ASO	AL	ANNISTON	05	ANB	95	N	CE*	2	
		DOTHAN	31	DHN	95	VR	NR	2	
		MUSCLE SHOALS	29	MSL	93	N	CE	2	
		TUSCALOOSA	04	TCL	96	N	CE	2	
	FL	GAINESVILLE	28	GNV	98	VR	NR	2	
		MELBOURNE	09R	MLB	97	VR	CE*	2	
		MIAMI	27R	VIN	98	W	NR	2	
		SARASOTA	32	SRQ	95	N	NR	2	
		ST PETERSBURG	17L	PIE	95	VR	NR	2	
	GA	ALBANY	04	ABY	95	VR	CE*	2	
		ATLANTA	26L	BRU	96	W	CE	2	
		ATLANTA	27L	FSQ	96	W	CE	1	MM
		CHAMBLEE	20L	PDK	93	W	CE*	2	
		FULTON CO.	08R	FTY	96	N	CE	2	
		VALDOSTA	35	VLD	98	N	CE*	2	

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REG	ST	LOCATION	RW	ID	FY	LOC	GS	MK	
ASO	KY	COVINGTON	09R	URN	96	W	CE	2	
		LOUISVILLE	19	ADO	97	W	CE*	2	
		OWENSBORO	35	OWB	95	N	NR	2	
		PADUKAH	04	PAH	95	N	SB	2	
	MS	COLUMBUS	18	GTR	98	VR	CE	2	
		GREENVILLE	18L	GLH	97	VR	NR	2	
		HATTIESBURG	18	PIB	98	N	CE*	2	
		MCCOMB	15	MCB	95	N	CE*	1	LOC OM
	NC	KINSTON	05	ISO	98	N	CE*	2	
	SC	FLORENCE	09	FLO	96	N	NR	2	
		NO. MYRTLE BEACH	23	CRE	98	N	NR	2	
	TN	CROSSVILLE	25	CSV	98	W	CE*	2	
		JACKSON	02	MKL	93	VR	SB	2	1ST ART #4
		MEMPHIS	18L	SDU	97	W	CE*	2	
		NASHVILLE (ASI)	20L	SSX	93	N	CE	MM	
	VI	ST CROIX	09	STX	93	W	CE	2	V/R REPLACE
ASW	AR	FAYETTEVILLE	16	FYV	96	N	CE*	2	New GS
		HOT SPRINGS	05	HOT	96	N	NR	2	
		ROGERS (ASI)	19	ROG	93	N	EF	MM	RET. EF
		TEXARKANA	22	TXK	93	VR	NR	2	
	LA	NEW ORLEANS	18R	NEW	95	W	NR	1	MM
		NEW ORLEANS	01	JFI	95	W	SB	2	
	NM	HOBBS	03	HOB	95	N	NR	2	
		ROSWELL	21	ROW	97	VR	NR	2	
	OK	OKLAHOMA CITY	17R	OKC	97	W	NR	2	
	TX	BROWNSVILLE	13R	BRO	95	VR	NR	2	
		COLLEGE STATION	34	CLL	98	VR	SB	2	
		CONROE (ASI)	14	CXO	93	LPD	SB	1	MM
		DALLAS LOVE FIELD	13L	DAL	93			1	MM
		HARLINGEN	17R	HRL	95	VR	NR	2	
		HOUSTON	14L	HSQ	93	W	NR	2	
		LAREDO	17R	LRD	98	N	NR	2	
		MCALLEN	13	MFE	98	VR	NR	2	
		TEMPLE	15	TPL	97	VR	NR	2	
		WACO	17L	CNW	95	N	NR	2	TWA REPLACE
AWP	AM	SAMOA TAFUNA	05	TUT	93	W	CE	1	MM
	AZ	PHOENIX	08R	PHX	97	VR	NR	2	
		TUCSON	11L	TUS	93	VR	NR	2	
		YUMA	21R	YUM	93	W	NR	2	
	CA	CRESCENT CITY	11	CEC	95	W	NR	1	MM
		EL CAJON	27	SEE	95	W	--	2	LOC
		LOS ANGELES	06R	GPE	96	W	CE	1	MM
		LOS ANGELES	07L	IAS	96	W	CE	1	MM
		MERCED	30	MCE	97	VR	NR	2	

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AWP	CA	MODESTO	28R	MOD	96	W	SB	2	
		PALMDALE	25	PMD	95	W	NR	2	TWA REPLACE
		REDDING	34	RDD	97	VR	NR	2	
		SALINAS	31	SNS	95	W	SB	2	
		SANTA MARIA	12	SMX	96	W	NR	2	
		SANTA ROSA	32	STS	97	W	NR	2	
		TORRANCE	29R	TOA	98	W	NR	2	
	GU	AGANA	06R	GUM	97	W	CE	2	
	HI	HAWAII KONA	17	KOA	97	VR	NR	1	MM
		OAHU HONOLULU	04R	IUM	97	W	NR	2	

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